

## THE STANFORD EXPEDITION TO BRAZIL, 1911.

J. C. BRANNER, *Director*.A PROTECTIVE ADAPTATION IN A BRAZILIAN  
MEMBRACID.

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On his first visit to the tropics a collector is sure to have a great many disappointments, especially if he has preconceived ideas as to what he expects to find there. My first surprise came at Para, almost as soon as we landed, when in company with Dr. Heath, I spent the evening collecting at arc lights. Our pockets were full of collecting jars, but we returned, having seen one cockroach and nothing more. Of course, later on we had fair collecting at lights, but in general, conditions were quite unlike our imaginations had pictured them to be. There were noticeable exceptions to the rule, in particular two insect groups ants and the Hemipterous family Membracidæ, which not only came up to our expectations but surpassed them, the former on account of their great abundance and the latter because of the varied and bizarre structures which were quite in accord with our ideas as to what tropical insect life should be.

In the Membracidæ there seems to be no limit in structure beyond which the pronotum will not develop. It may resemble in miniature a Roman helmet, an anchor or a pawnbroker's sign, often being so large and awkward looking that one would think it an actual hindrance to the insect. This awkward appearance impresses one most when the insects are removed from their natural surroundings. On their food plant they are not more noticeable than insects of simpler structure, while some are even good mimics of galls, seeds, fruit and other objects of a vegetable nature. Poulton<sup>1</sup> in an interesting and detailed paper has pointed out the resemblances of many of the Membracidæ to various plant growths

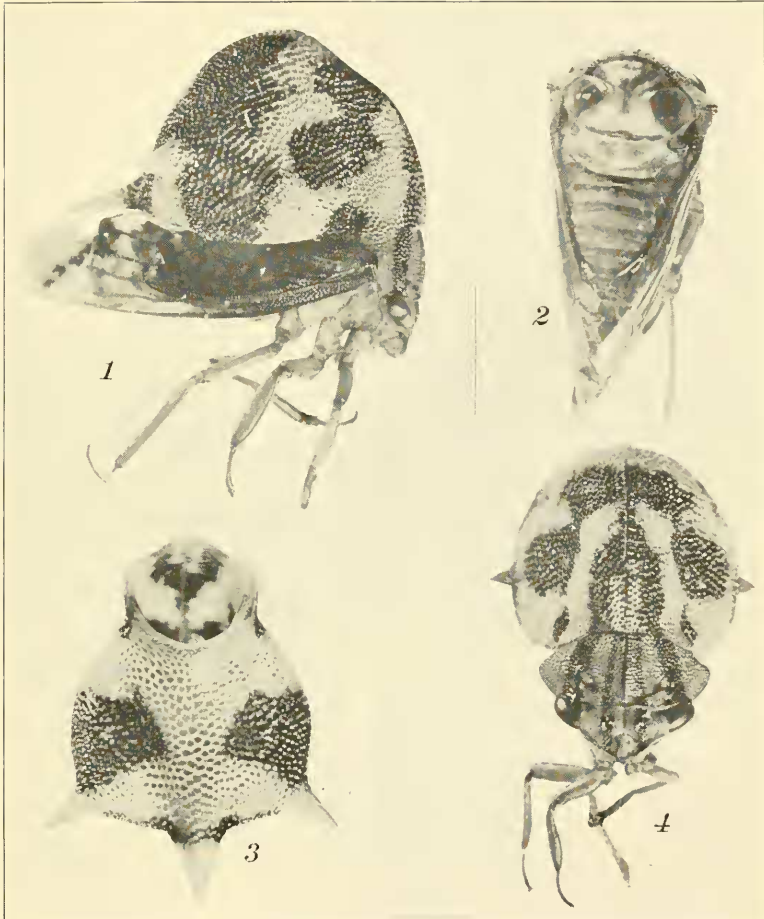
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<sup>1</sup>Suggestions as to the Meaning of the Shapes and Colors of the Membracidæ in the Struggle for Existence, in Buckton's Monograph of the Membracidæ. London, 1903.

and to protected insects such as ants, Coccinellid beetles, etc. He considers the structure and patterns to be distinctly protective in nature. Sharp (Cambridge Nat. Hist. p. 577) states that no remarkable habits are known to occur in the family.

One of the extraordinarily developed genera of the family is Combophora, which has the pronotum enormously inflated, it being often as large as the rest of the insect, and armed with sharp spines. At Porto Velho, on the Rio Madeira, I had an opportunity to observe living specimens of one of the species (*C. beski* Germ.). Beske, who first observed it, says that the nymphs are attended by ants, which obtain a liquid secreted from a space between the head and pronotum. Poulton suggests that the insect may be a mimic of a Coccinellid beetle. Those individuals which I first found were on a low bush in a little clearing. Ants were running about on the leaves and I was collecting these when the bugs began flying with a loud buzz away from the bush. Those which had remained were on the stems, and their gall-like form and color pattern blended well with the background, rendering the insect quite inconspicuous for such a large, oddly shaped and marked form. I took two before they all flew away, and then found that those I had picked up had flown also, *after detaching themselves from the large inflated pronotum and leaving this for me to place in the collecting bottle!* The species was not at all common locally, and I afterwards found only two specimens. Both of these were flying. When netted they immediately separated from the pronotum, which by itself is far more conspicuous than the rest of the insect, and attempted to fly away without it.

I think it may safely be considered that the easily detached pronotum is distinctly advantageous to the possessor, its use being comparable with that of the loosely jointed tails of certain lizards. Neither of these adaptations is resorted to till coloration or other means of defense have failed, and the object in both cases is to distract the attention of the foe till a place of safety can be reached. The lizard has the advantage of being able to grow another tail, but it is not probable that this means of defense is used many times during the life of an individual. In other ways, the adaptation of Combophora would seem to be an effective defense. The tail of a lizard must give some satisfaction to the captor, and in no wise would deter it from further attacks, but



*Combophora beski* Germ. 1, Lateral view of complete insect; 2, dorsal view, pronotal development detached; 3, detached pronotum, from beneath; 4, front view of complete insect. Six times natural size.